

FIRST RECORD OF PARASITISM OF *MANOMERA TENUESCENS* (PHASMIDA: HETERONEMIIDAE) BY *PHASMOPHAGA ANTENNALIS* (DIPTERA: TACHINIDAE)¹

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ABSTRACT:The first case of parasitism of *Manomera tenuescens* by *Phasmophaga antennalis* is reported. This record represents the third known phasmid host for *P. antennalis* and the first known parasite for *M. tenuescens*.

Flies in the family Tachinidae are the only known endoparasites of Phasmida (Arnaud 1978; Bedford 1978; Ferrar 1987). In North America five walking-stick species are known to be their hosts (Table 1). The tachinid fly *Phasmophaga antennalis* Townsend has been reported to parasitize two of these species: *Anisomorpha buprestoides* (Stoll) and *Diapheromera femorata* (Say). This article provides the first record of parasitism for a third host, *Manomera tenuescens* (Scudder).

Manomera tenuescens is a gracile phasmid well camouflaged in its habitat. The females are green and yellow, resembling blades of grass, while the males are smaller, purplish-brown, and have the appearance of slender twigs or grass stems. No parasites were previously known for this species.

On June 7, 1997 several adults of *M. tenuescens* were collected from a three acre grassy clearing in a pine and turkey oak scrub forest in Alachua County near Gainesville, Florida. Although Blatchley (1920) states that *M. tenuescens* is rarely found "in low damp places", all specimens observed were restricted to an area near the margin of a small creek.

The phasmids were transported to an insect rearing room at the University of Georgia and housed in a screened cage. On June 10, a fly larva was observed emerging from the anterior region of the abdomen of a female *M. tenuescens*. The larva was transferred to a sealed plastic box filled with moist sand, where it immediately buried itself and subsequently pupated. It was kept at 25° C until eclosion. On June 18, the formerly parasitized phasmid died. On the June 27, an adult male of *P. antennalis* eclosed. These observations are similar to those reported by Neff and Eisner (1960) for parasitized *A. buprestoides*.

Unfortunately, little is known about the biology of *P. antennalis* and many interesting questions remain unanswered. For example, its egg anatomy is consistent with a leaf-ovipositing habit whereby the host becomes parasitized by

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consuming leaves bearing the eggs (Townsend, 1909). Assuming that this type of oviposition occurs, do the female flies search for a likely host plant, or do they target feeding phasmids and oviposit on nearby vegetation? Are additional phasmid species or other folivorous insects parasitized? Are some hosts preferred over others?

More information is needed about the natural history of this fly. Questions regarding host specificity might best be studied in the Gainesville area, where all three known hosts occur sympatrically. The authors hope that these new observations stimulate study of the interactions between this interesting parasite and its hosts, so that these questions can be addressed.

Table 1. Tachinidae recorded from North American Phasmida. Arnaud (1978) provides complete literature citations for these records, with the exception of the new record presented here and that of Sandoval & Vickery (1996).

Tachinidae parasite	Phasmida host	Reported by
<i>Euhalidaya genalis</i>	<i>Diapheromera femorata</i>	Walton 1914
<i>Phasmophaga antennalis</i>	<i>D. femorata</i>	Townsend 1909
<i>P. antennalis</i>	<i>Manomera tenuescens</i>	*New Record
<i>P. antennalis</i>	<i>Anisomorpha buprestoides</i>	Neff & Eisner 1960
<i>P. meridionalis</i>	<i>A. buprestoides</i>	Russell 1912
<i>Roeseliopsis americana</i>	<i>A. buprestoides</i>	Neff & Eisner 1960
<i>Tachina</i> sp.	<i>D. femorata</i>	Osten Sacken 1877
Tachinidae	<i>Timema douglasi</i>	Sandoval & Vickery 1996
Tachinidae	<i>T. cristinae</i>	Sandoval & Vickery 1996
Tachinidae	<i>T. californicum</i>	Sandoval & Vickery 1996

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LITERATURE CITED

- Arnaud, P.H., Jr. 1978. A host-parasite catalog of North American Tachinidae (Diptera). Misc. Publ. U. S. Dep. Agric. 1319: 1-860.
- Bedford, G.O. 1978. Biology and ecology of the Phasmatodea. Ann. Rev. Entomol. 23: 125-49.
- Blatchley, W. S. 1920. The Orthoptera of northeastern America, with especial reference to the faunas of Indiana and Florida. Nat. Pub. Co. Indianapolis 784pp.
- Ferrar, P. 1987. A guide to the breeding habits and immature stages of Diptera Cyclorrhapha (part I: text). E.J. Brill/Scand. Sci. Pr. 478pp.
- Neff, S.E. & Eisner, T. 1960. Note on two tachinid parasites of the walking stick, *Anisomorpha buprestoides* (Stoll). Bull. Brooklyn Entomol. Soc. 55(4): 101-103.
- Townsend, C.H.T. 1909. Descriptions of some new Tachinidae. Ann. Entomol. Soc. Am. 2: 243-250.
- Sandoval, C.P. & Vickery, V.R. 1996. *Timema douglasi* (Phasmatoptera: Timematodea), a new parthenogenetic species from southwestern Oregon and northern California, with notes on other species. Can. Entomol. 128: 79-84.